STATE OF CALIFORNIA—STATE AND CONSUMER SERVICES AGENCY PETE WILSON, *Governor*

DEPARTMENT OF GENERAL SERVICES
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May 27, 1993

Ms. Donna R. Searcy, Secretary
Federal Communications Commission
1919 M Street, NW Room 222
Washington, DC 20554

Dear Ms. Searcy:

The State of California submits these comments in response to the Commission's Notice of Proposed Rule Making, PR Docket Number 92-235, In the Matter of Replacement of Part 90 by Part 88 to Revise the Private Land Mobile Radio Services and Modify the Policies Governing Them. The State has addressed specific inquiries made in this proceeding with regard to the impact on State agencies.

In accordance with Section 1.419 of the Federal Communications Commission Rules and Regulations, the State hereby submits a formal filing. Enclosed for filing in this proceeding are an original and nine (9) copies of the State's comments.

To ensure delivery of the State's comments in a timely manner we have prepared two separate but identical filings. Each filing is being sent under separate cover. In the event that both filings are received, one may be destroyed.

Respectfully submitted,

Pete Wanzenried

PETE WANZENRIED
Assistant Division Chief

PW:GSN:rgl:92-235.LTR

Enclosures

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of	)	
	)	
Replacement of Part 90 by Part 88 to	)	PR Docket No. 92-235
Revise the Private Land Mobile Radio	)	
Services and Modify the Policies	)	
Governing Them	)	

To: The Commission

COMMENTS OF THE STATE OF CALIFORNIA

The State of California ("State"), hereby submits the following comments in response to the Commission's Notice of Proposed Rule Making in the above-captioned proceeding, FCC 92-469, released November 6, 1992.

Respectfully submitted,

State of California
Department of General Services
Telecommunications Division
601 Sequoia Pacific Blvd
Sacramento, CA 95814-0282

By: Pete Wanzenried
Pete Wanzenried, Assistant Division Chief

May 27, 1993

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SUMMARY

1. "Re-farming" of the land mobile spectrum offers the American people an opportunity to apply 20-20 hindsight to correct the deficiencies of current practice and improve utilization of this valuable National resource. "Re-farming" not only offers great benefits for the future but also is desperately needed. It must, however, be done in a well-thought-out manner that carefully considers the impact of change upon existing users and maintains communications services which are vital to the well-being of our country. The State strongly supports the Commission's goal of providing for more efficient use of this limited resource, however, the State feels that the methods proposed in this Notice of Proposed Rule Making are ill-advised. Many of the Commission's proposed new rules would seriously disrupt and reduce the effectiveness of vital public safety communications systems, impose an undue financial burden on under-funded state and local governments, and threaten the safety of California citizens' lives and property.

2. The concept of "re-farming" is a complex issue that will have a long-term impact upon private land mobile, including the public safety services, radio communications. In many ways, the lengthy time between comment and reply implicit in the normal rule making process inhibits the free and open discussion of ideas that may be needed to resolve the issues to the satisfaction of all communities. The State has taken the opportunity to attend and participate in many discussions on this rule making. Each time California came away with new knowledge and understanding about its own needs and those of other users. Perhaps, the Commission should consider a synergistic approach to this problem as the quickest way to a solution. Such an approach was extremely successful in the proceedings leading to the 800 MHz National Plan for public safety use of the 821-824/866-869 MHz spectrum.

STATEMENT OF INTEREST

3. The California Department of General Services, Telecommunications Division is the technical engineering arm for all State agencies and has responsibility for the design, installation, and maintenance of all mobile radio systems used by those agencies. Furthermore, the Telecommunications Division is the single State agency authorized to obtain and hold Federal Communications Commission licenses for the operation of radio facilities in the Land Mobile Services. The State now holds over 3300 licenses in the six Public Safety Radio Services, the Special Emergency Radio Service, and the Business Radio Service. These licenses authorize operation of over 70,000 stations for State use with another 120,000 stations authorized for city/county/local agency use under mutual aid agreements. This proposed modification of the Rules will have a significant financial and operational impact upon the State's use of land mobile radios for many years to come.

INTRODUCTION

4. Land mobile radio has become a critical element of the public safety services provided to the public by state/county/local governmental entities. The radio has become so much a part of daily life that few people sit back and consider what it gives--a doorway to information that enables everyone to do their jobs better and more efficiently. With the passage of time, users have moved to improved technologies (from AM to FM, from wide-band to narrow-band). Moving to higher frequencies has allowed more users to be added and allowed existing users to make increased use of this tool. Once again, there are more users and uses than the available spectrum and the rules guiding use of that spectrum are able to support. The time has come for a bold leap forward in the use of this very valuable resource, the radio spectrum.

5. The State commends the Commission for stepping back and looking anew at how the radio spectrum could best be used to satisfy the many and diverse needs of the American people. This Notice of Proposed Rule Making has been nicknamed the "Refarming Docket", a name which implies "starting over" and which suits it well. In many ways, the State believes the Commission has proposed too bold a leap forward by setting performance criteria that are well beyond the capability of existing, proven technologies. Many manufacturers with whom the State discussed these proposals are not sure there is a technology that will satisfy the users' need for communications, while staying within the proposed criteria. By proposing very narrowband technology and extremely limited coverage, the Commission is not only ignoring today's needs of many users, but also pre-supposing a solution to the narrow-band problem that eliminates two of the strongest competitor technologies, TDMA (Time-Division-Multiple-Access) and CDMA (Code-Division-Multiple-Access). The State strongly believes it is too early in the developmental process to be making that sort of far-reaching decision.

6. Nonetheless, the demand for additional uses of the radio spectrum must be met. Currently, many Public Safety agencies are unable to obtain use of enough spectrum to meet their most basic needs. California can look forward in the not-too-distant future and see many new needs which will demand even more spectrum. Police agencies increasingly are extending data services into patrol vehicles by providing direct access to motor vehicle and want/warrant databases; fire agencies are looking at ways to provide building layout, disabled or bed-ridden person information, and hazardous material storage data to responding fire units; highways agencies are monitoring road and weather conditions to expedite response and treatment; police and other agencies are looking at ways to send documents, pictures ("mug-shots"), and fingerprints; police agencies are experimenting with ways to send "real-time" video during a traffic stop; highways agencies are developing Intelligent Vehicle Highway Systems---these are just some of the needs that are either here today or on the horizon. Many more needs are

beyond the State's ability to even forecast. All of us in the private land mobile radio industry need to look beyond simple voice as the primary use of the land mobile radio spectrum. While voice will continue to be a vital need, it will not be the only need that mobile radio communications systems must satisfy. Any new Rules must provide the flexibility to meet these other needs. The State does not see this flexibility in the proposed new Rules.

7. Another critical consideration is the financial consequences of migrating to any new system. When jails are being closed and convicted criminals released early, when police and fire agencies are laying off field personnel, when potholes in roads go un-repaired, when libraries and parks are closed, when every budget is a painful evaluation of which public programs can be scaled-back or eliminated, the Commission needs to recognize that government agencies at the state and local levels have severe fiscal constraints. While migrating to new technologies dangles the carrot of being able to do more and (perhaps) do it more efficiently, such a migration costs money. The costs associated with change and the benefits derived from that change must be considered in their relationship to the factors mentioned above. These are not easy decisions and, unless the Federal Government plans on fully funding the conversion, the Commission needs to keep these factors in mind in deciding what changes should be made, how those changes should be made, and how much time should be allowed for the change.

8. The time and effort required to make the necessary changes also must be considered. The number of people on staff, the technical capabilities of those people, and the on-going demand for service are factors the Commission must consider. New technologies require a new learning curve on how to use the technology most effectively and how to solve discovered problems. Even 30-year veterans may find themselves as inexperienced as the new kid. Existing systems have to be replaced in an orderly manner with the end users seeing a relatively painless transition from the old to the new. The Commission cannot destroy what those users

already have without first giving them something that is as good or better.

9. Finally, the Commission must remember that some systems are too big to be converted all at once. The California Department of Forestry and Fire Protection operates a statewide radio system involving hundreds of mountain-top mobile relay stations, hundreds of base/control stations, and thousands of mobile/portable units. It is nearly impossible to divide this system into small pieces. When a major fire occurs, units come from throughout the State to assist local firefighters. Other units move forward to enhance their ability to respond or as back-fill for units already deployed. The Commission must allow for a gradual over-building of a complete new system prior to dismantling the old system. The Commission does not have the luxury of thinking of this "re-farming" effort as if everyone were starting over. The migration path must be considered as being a critical part of the problem.

REDUCTION IN OCCUPIED BANDWIDTH BY 1996

10. The State opposes the proposal to reduce the occupied bandwidth by January 1, 1996, as being prohibitively expensive, with little prognosis for making any improvement in spectrum use. Assuming it takes an average of 1/2-hour to convert each radio, then it would take approximately 35,000 staff-hours, or 10% of the Telecommunications Division's total available workforce for the next two years to convert the State's radios. California's "benefit" for this conversion will be radio systems that are more susceptible to noise problems and don't sound as good as the existing systems. Continuous Tone-Coded Squelch Systems (CTCSS) also will be seriously degraded or rendered inoperable. California receives no benefit from the improved spectrum efficiency, because comparable changes were not made to the receivers. No significant improvements in spectrum use will be possible.

11. While it is possible to reduce the occupied bandwidth of an FM transmitter by reducing its deviation, this in no way changes the modulation acceptance bandwidth of the associated receiver. Without also modifying the receiver, very little, if any, benefit will be realized from a reduction in occupied bandwidth. It is true, the receiver will have less interference from adjacent channel transmitters, but it also will have less signal from the desired transmitter. Whether there will be any net benefit is highly arguable. In a system, the performance of the transmitter needs to be balanced with the performance of the receiver. Thus, if the occupied bandwidth of the transmitter is reduced, then a comparable reduction in the modulation acceptance bandwidth of the associated receiver should also be made. Changing the modulation acceptance bandwidth of the receiver, however, is not a simple task. Radios do not have a "PERMAKAY" filter that can be changed as was done the last time the occupied bandwidth of the transmitters was reduced. Receiver filtering in most of today's radios is done digitally. In some radios, the needed "filter" change might be done by "re-programming" the filter. On other radios, one or more circuit elements will have to be changed out, which may require a "depot-level" or "factory-level" modification. On still other radios, it will not be possible to modify the radio at all. Thus, to gain any benefit from reducing the occupied bandwidth, users will incur significant extra expense to modify the receiver and will have to take the radios out-of-service for modification.

12. California also concludes there will be no material benefit derived from converting both the transmitter and the receiver to narrower bandwidths. Consider, for example, two radio systems, "A" and "B", operating in the 150-174 MHz band. Due to frequency congestion problems, "A" and "B" currently operate on 15 kHz separated adjacent channels with minimal workable physical separation. While it may be possible for "C" to come along after the reduction in transmitter occupied bandwidth and operate closer to "A" than "B" was able to operate, "C", nonetheless, must also consider "B" as a co-channel user. Few new channel assignments will be possible.

72-76 MHz BAND

13. The State opposes establishment of 5 kHz channel spacing as the goal in the 72-76 MHz band. California operates fixed stations in this band as a means of interconnecting remote base stations to a dispatch point under the provisions of Section 90.257 of the FCC Rules and Regulations. Often, these 72-76 MHz control links provide the final hop when no other method of control is possible (i.e. microwave will not work due to a "no-line-of-sight" path, leased line services are not available due to the remoteness of the facility, and/or other methods of control are not feasible due to the length of the control path). To operate effectively as a control link, however, the modulation characteristics of the 72-76 MHz control station must be compatible with those of the station being controlled. Since the station being controlled may be operating in the 30-50 MHz, the 150-174 MHz, the 450-512 MHz, or the 800 MHz bands, the channel bandwidth should be not less than the bandwidth specified in the other bands.

14. The State also operates a limited number of low-power mobile units in this band. As such, the State is acutely aware that both the 72-76 MHz control station and the 72-76 MHz mobile radio markets are "niche" markets for the suppliers. The continued availability of radios in such a "niche" market is dependent upon the manufacturers maximizing re-use of technology from other products. Ideally, the only difference between the 72-76 MHz radio and a radio from any other band would be the final RF stages. But for this to be possible, the modulation characteristics of the 72-76 MHz radio need to be compatible with the modulation characteristics of radios in the other bands.

15. Finally, the proposed Rule changes will have no impact upon other users of the 72-76 MHz band. This band is shared not only by eligible users under Part 90 but also by eligible users under Parts 22 and 87. In each case, the Rules governing use of the band are different

with Part 90 users held to the strictest standards. Furthermore, use of the band is totally uncoordinated. More than once, the State has had the functionality of one of its control links destroyed when another user has installed a co-channel station "nearby". The band's heavy use for control links means that many stations are located on mountain-tops and may be susceptible to interference from other mountain-top stations more than 100 miles away. Of particular concern is the band's use by paging systems, which typically operate at higher powers with nearly 100% duty cycle. Therefore, the State recommends the Commission review all uses of

For this reason, public safety agencies are reluctant to commit to using new or unproven technologies, yet the Commission proposes exactly that by establishing a 5 kHz channelization plan for the 150-174 MHz band. The only candidate technology purporting to operate in a 5 kHz channel is Amplitude Compandered Single Sideband (ACSB). ACSB has been around for many years and the State has worked with various manufacturers offering that technology. To date, no such product has demonstrated its ability to meet the State's public safety communications needs. Most recently, the 220-222 MHz spectrum was established with the thought in mind that ACSB needed "virgin" spectrum to prove its viability, but systems in that band are languishing far behind schedule. The Associated Public Safety Communications Officers (APCO), in association with the National Association of State Telecommunications Directors (NASTD), several Federal agencies, and the Telecommunications Industry Association (TIA), have been working for more

18. There is an increasing demand for interoperability between Federal, State, and local agencies. The "war on drugs" and other crime issues have resulted in many joint task forces. Federal, State, and local firefighters all respond to a large forest or wildland fire. Newer synthesized radios have simplified the interoperability problem for these agencies by making it possible for each agency to "program" the other agency's frequencies into their radios. This works today in the 150-174 MHz band, because although Part 90 users technically use 30 kHz wide channels spaced every 15 kHz, their equipment typically operates as if the channel were a 25 kHz wide channel. Thus, the modulation characteristics of the "Part 90 radio" are identical to the modulation characteristics of the "Federal radio". Since the Federal Government has already selected a channelization scheme for the 150-174 MHz band that leads toward a 6.25 kHz channelization plan, public safety users may lose their ability to inter-operate with Federal agencies if the Commission continues with a 5 kHz channelization plan for the 150-174 MHz spectrum. Furthermore, usefulness of the Boise Inter-Agency Fire Cache to the State will be seriously restricted should there be an incompatibility between the "Federal radio" and the "Part 88 radio".

19. Public Safety agencies within California already experience significant problems of interference from stations in Mexico. The proposed "re-farming" of the 150-174 MHz band offers a prime opportunity for the Commission to develop an equitable sharing arrangement acceptable to both countries. The State recommends a plan based around block allocation of frequencies to each country for operations in a buffer zone near the border. Another zone might be created, within which U. S. stations would be permitted to operate on interstitial frequencies. The State further recommends that the Commission delay implementation of Part 88 within a buffer zone along the U.S.-Mexico border until such a treaty can be negotiated.

20. The State is particularly disturbed by the proposal to allocate every third channel in the 150-174 MHz for non-Public Safety use. The 150-174 MHz spectrum is the best spectrum available for meeting Public Safety needs, particularly at the state level. It works well over reasonably wide areas, it works well over many different types of terrain, it works well in foliage, its antennas are reasonably sized, and it is reasonably unaffected by environmental noise. None of the other bands meet these criteria as well as the 150-174 MHz band. Few public safety agencies are moving to other bands because those bands are better. Rather, they are moving because the other band offers spectrum which is more attainable and equipment commonality requirements stipulate they keep all operations in a single band. There is great demand for new assignments in the 150-174 MHz band, many more than could be satisfied if all of the "new" channels were assigned to public safety. Even the State's requirements are not likely to be met. For example, the California Highway Patrol (CHP) currently operates an extensive communications system at 42 MHz.[1/] It would like to move to the 150-174 MHz band to resolve environmental noise problems such as ignition noise in vehicles, to resolve "skip" problems from/to other users across the country, to permit installation of mobile relays as a means of improving field operations, to simplify use of portable radios, and to simplify installations on motorcycles. Unfortunately, there is little hope there will be sufficient spectrum in the 150-174 MHz band to satisfy CHP's need. Quite frankly, the State hopes the VHF television spectrum at 174-216 MHz will be made available for land mobile use after TV stations implement High Definition TV. If the Commission continues with the plan to open every third channel for other use, public safety will lose these channels. This is not because public safety doesn't desperately need the channels, but because public safety agencies cannot move as fast as an entrepreneur can in licensing the channel and building a system.

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[1] This system consisting of 345 base stations, 5500 mobile units, and 5200 portable units provides radio coverage to over 95% of the State's roadway system. Vehicular repeater systems in each car permit officers using 150 MHz portable radios to access the 42 MHz system.

21. Assigning every third channel to other users will further complicate the frequency coordination problem. Transmitter and receiver filters are not perfect, they exhibit "roll-off" characteristics that result in adjacent channels having unwanted impact upon a system's operation. Some of these impacts can be minimized by proper selection of radio sites, by proper selection of station power/ERP, by the use of directional antennas, and by other techniques. Still, they cannot be eliminated. The current block allocation of frequencies to a single radio service serves two purposes. First, it establishes a single frequency coordinator who is representative of and responsible to all of the users who might be affected by a new/modified station.[2/] The proposed plan ensures that every channel assignment will involve at least two coordinators. Second, except at the block edges, co-channel and adjacent channel users are of a similar type and, therefore, more likely to have compatible usage patterns. The proposed plan ensures that every channel assignment has an unrelated user, whose usage patterns may be totally incompatible, on at least one side.

22. Currently, there is a severe problem at many mountain-top radio sites due to intermodulation products resulting from multiple transmitters and desensitization of nearby receivers. The more transmitters at a single (or nearby) site, the more intermodulation products can be created.[3/] Whether these products will cause any problems is a factor of how strong they are (the higher the power of the contributing transmitters, the higher the power of the product) and whether they fall within or near the passband of a receiver. The greater the number of products generated, the greater the odds that one or more products will fall within the passband of a receiver. Receiver desensitization is a problem related to the inability to build

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[2] For those instances at the edge of a block, the Rules provide that the coordinator obtain the concurrence from the coordinator responsible for the potentially affected channel. This "cross-coordination" process induces a delay in the coordination process and may result in increased coordination fees.

[3] The number of intermodulation products increases exponentially as more transmitters are added.

perfect filters to protect our receivers from all but the desired signal. This unwanted RF energy entering the receiver affects the ability of the "front-end" circuits to respond to the wanted signal. The greater the frequency separation between the wanted and unwanted signals, the better filters are able to eliminate the unwanted signal. Intermodulation and receiver desensitization are particular problems in the 150-174 MHz band due to the lack of standard pairing for mobile relay operations and the number of simplex operations that share common mountain-top radio sites. The proposed 5 kHz channelization plan will exacerbate these problems by reducing the potential separation between wanted, unwanted, and intermodulation product signals by 1/3.

23. The State recommends the Commission adopt a standardized pairing of channels in the 150-174 MHz band to enhance usability of the band for mobile relay operations. The lack of such a plan has resulted in a haphazard approach toward the design of mobile relay systems and an ineffective use of the spectrum. The input/output of one system is uncoordinated with the input/output of the next system resulting in interference. Stations are spaced at greater than otherwise optimal distances to prevent interference problems. Intermodulation products and desensitization are more of a problem, because the frequency spacing between transmitters and receivers is based upon which frequencies were available at the time and not upon optimizing the selection. Creating standardized pairings and transitioning to those pairings is an essential step toward making the 150-174 MHz band more useful for all.

24. The State foresees a need in the not too distant future for new services that are likely to require more, not less, per-channel bandwidth than the current voice communications require. These services include increased data transmission speeds to facilitate field access to information such as motor vehicle registration, driver license, fingerprint, and want/warrant files and to provide real-time mapping to include traffic obstructions and "best route" information. They include transmission of video, which may be compressed but is better than current

"slowscan" techniques. They include sending facsimile documents and photographic-grade pictures. They are the types of services which make TDMA and CDMA techniques intriguing, because those techniques lend themselves to dynamic reallocation of bandwidth based upon the type of message traffic. Few of these services can be provided in a 5 kHz wide channel, nor in a 6.25 kHz channel for that matter. They all are likely to require that two or more "channels" be joined together to attain adequate bandwidth to permit data transmission speeds which ensure the transmission doesn't take too long. Losing access to every third channel will limit the amount of bandwidth that could ultimately be joined together and, therefore, the ultimate data transmission speed which might be achieved.

25. The State recommends the Commission adopt a channelization plan based upon 12.5 kHz channels. Even though this conversion offers little improvement over the existing channelization plan, it establishes compatibility with the Federal portion of the spectrum and with use of the band in Mexico. Furthermore, it sets the stage for migration to what we believe to be the most likely next step, movement to modulation techniques offering spectral efficiency equivalent to 6.25 kHz channelization. Even this simple a conversion cannot be accomplished overnight. Many synthesized radios cannot be programmed to operate on what are today "illegal" frequencies. We need time to replace those radios. The State recommends a transition period of at least 10 years.

LOSS OF STATE-ONLY/INTER-SYSTEM CHANNEL ASSIGNMENTS

26. The State opposes the loss of "state-only" channel assignments in the 150-174 MHz band and asks that additional channels be assigned for "state-only" use. State operations, by their very nature, are wide-area operations. A single State agency may need the ability to

operate anywhere in the state at any time and may need to move large distances in a short period of time. For example, a narcotics surveillance may start in San Francisco, work its way through Los Angeles and end in San Diego (a distance of over 500 miles) in one day. The agents involved in this investigation need radios that will operate throughout those areas with a minimal amount of operational complexity. Similarly, the forest and wildland fire activities of the California Department of Forestry and Fire Protection require the moving of large numbers of personnel and equipment throughout the state on short notice. Currently, California lacks the numbers of channels needed to satisfy State needs. Efforts to clear non-"state-only" channels on a statewide basis have met significant resistance from current users, even when the State has offered to pay all expenses for the agency changing channels.

27. The State also opposes the loss of the "Inter-system operations only" channel assignments. Years ago, California was fortunate to have some far-thinking individuals who set aside several frequencies for mutual aid purposes. These frequencies included not only those identified in the Rules for inter-system use, but also some other frequencies. Plans were written and approved by the various user groups to protect those frequencies for use by all. Over the years, these frequencies and the systems of which they are a part have proved themselves to be an invaluable resource. With the designation of the frequency coordinators and the unmet demands for additional channel assignments, the State[4/] has found it necessary to be on constant guard against the non-"inter-system only" channels being assigned by one of the coordinators because it appears to be unused. Mutual aid is a real need which often goes unsatisfied. The Commission should establish more "inter-system only" channels, not remove

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[4] Some of the Plans stipulate that the State shall be the sole licensee on the frequencies involved. Through mutual aid agreements, all eligible agencies within the state are then authorized to operate on the channel under the State's license. Other Plans stipulate that each using agency shall be the licensee for its own equipment. Nonetheless, the State is the system administrator and responsible for ensuring that all users abide by the rules and use of the channels is protected for the common good.

the protection from those already designated. The State recommends the Commission establish a process that provides for user input to determining an appropriate number of "inter-system only" channels for each public safety radio service in each of the frequency bands. The specific number of channels and the distribution of those channels may vary from region-to-region across the country.

450-512 MHz BAND

28. The State supports the concept of moving toward 6.25 kHz channelization in the 450-512 MHz band but believes the Commission plan to be too aggressive. State agencies currently operate many radios on the 12.5 kHz channel spacings provided for under the current rules. Simply reducing the deviation of the transmitters, however, will not provide for unlimited utilization of the 12.5 kHz channels. The modulation acceptance bandwidth problem in the receivers discussed above will still exist. Furthermore, as also discussed above, the State is not convinced that true 6.25 kHz channelization is an appropriate solution to the problem.

29. The State recommends the Commission adopt a 12.5 kHz channelization plan at this time. This will allow increased use of this band with minimal impact upon existing users. Full conversion to 12.5 kHz channelization should be scheduled over a 10-year time period to allow for amortization of existing equipment.

30. The State further recommends the Commission state a goal of attaining spectral efficiency equivalent to single channel spacing of 6.25 kHz but refrain from deciding how that efficiency is to be accomplished. Then, in approximately 3-5 years, re-open the issue as a means of reviewing current technology. There is no assurance at this point in time that a Frequency Division Multiple Access (FDMA) approach to the spectral efficiency problem is

preferable over the TDMA or CDMA approach. Do not make a decision until a candidate solution has demonstrated its ability to meet the operational requirements of the users, including public safety.

31. The State opposes the specific frequency assignments for the 450-470 MHz band as listed in Section 88.613 of the proposed Rules. These channel assignments will unnecessarily complicate migration to the narrower bandwidths. By establishing these frequency assignments, the Commission is delaying the beginning of any migration until such time as an agency has replaced all of their existing radios. Once all of the radios in a system have been replaced, the agency will then have to re-program the frequency on all remaining radios "simultaneously" to complete the transition. Furthermore, existing mobile radio test equipment may not be capable of measuring the RF frequency of a transmitter to an accuracy of 5 Hz as required by the channel assignments. The State recommends the Commission keep the existing "25 kHz" channel assignments and add "new" at 12.5 kHz intervals between those channels. This will result in channel assignments of 451.0125 MHz, 451.025 MHz, 451.0375 MHz, etc.[5/] Should the Commission continue with plans to make channel assignments based upon 6.25 kHz channel separations, then the additional channels should be added at the mid-points between the "12.5 kHz" channels identified above. This plan will greatly simplify migration by allowing existing equipment to be replaced gradually and will permit existing test equipment to be used.

32. For the same reasons discussed above, the State opposes the specific frequency assignments for the 470-512 MHz band as listed in Section 88.783 of the proposed Rules. The Commission should keep the existing 25 kHz-spaced channels and add new 12.5 kHz-spaced

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[5] Many radios currently available can be programmed to these frequencies, because of valid uses permitted under Section 90.267 of the Rules.

assignments between each existing channel.[6/] Should the Commission continue with plans to make channel assignments based upon 6.25 kHz channel separations, then the additional channels should be added at the mid-points between the "12.5 kHz" channels.

MIGRATION

33. Graceful migration is a critical issue. Public safety radio communications systems cannot be disabled or significantly degraded during a transition period. To the greatest extent possible, the migration must appear to be either seamless or a constant improvement in system performance. A loss in performance is not acceptable to the end user of the radio system.

34. Changing to a new technology is not without cost, particularly if the new technology is radically different from the current technology. Few governmental entities, California included, can afford to replace all of their radio equipment in one block purchase. A more common migration is to replace equipment as it becomes old or too costly to repair. Additionally, systems

equipment not yet replaced. This will allow agencies to replace/upgrade their equipment in an orderly manner more closely approximating normal patterns. Later, each agency will be able to schedule the final equipment upgrade and plan a smooth transition to operations under the new rules. Due to normal equipment replacement cycles and the availability of staff to accomplish the work, this transition period needs to be 10-12 years in length.

36. With the State's recommendation that the Commission start a transition to 12.5 kHz channelization and review movement to "6.25 kHz equivalent" channelization in 3-5 years, California foresees a situation wherein there will be two transition periods under way at the same time but offset in their start/stop dates by 3-5 years. This is not necessarily bad. An agency may well be in a position to make a decision to skip the 12.5 kHz transition completely and move directly to a "6.25 kHz equivalent" transition. In that situation, the agency may actually save money by making only one change and may accomplish the upgrade more quickly than would be possible under the two-step process.

HEIGHT/POWER LIMITS

37. The State opposes the Commission's proposed restrictions on Effective Radiated Power (ERP) based upon the Height Above Average Terrain (HAAT) as being arbitrary and unrealistic. The State designs its radio systems to provide coverage in a pre-defined geographic area which oftentimes is based upon some geo-political boundary. This geographic area may be the confines and immediate area around a state prison covering less than one square mile or a California Highway Patrol Dispatch Area covering thousands of square miles. California may not always select the best site from the standpoint of minimizing coverage to only that needed, but whether it takes one site or one hundred sites, the pre-defined area must be covered. No set of rules based upon HAAT can adequately address this diversity of need.

38. The location of radio sites is controlled by factors other than the boundaries of the geographic area to be covered. Specific plots of land may not be available for use as radio sites due to environmental or political concerns.[7] Access to the land may not be possible. The availability of commercial power must also be considered. The cost of constucting a radio vault, tower, and access road along with other costs may make development of a site prohibitively expensive. Some or all of these factors may also limit an applicant's ability to upgrade an existing radio facility to permit installation of additional equipment. Site issues are not an insignifcant factor in the design of a radio system.

39. The State recommends the Commission require applicants to define their required geographical coverage area and explain any need for coverage exceeding their geo-political boundaries. The designated frequency coordinator would then be empowered to include coverage as a factor in their review process and be permitted to recommend power and antenna pattern limitations that tailor coverage to that needed by the applicant. Due to the site development concerns discussed above, the State is reluctant to include site selection as a factor in the frequency coordinator's review process. While the frequency coordinator might suggest an alternate site, the final decision on site selection must rest with the applicant.

CONSOLIDATION OF RADIO SERVICES

40. The State opposes the proposal to consolidate the six public safety radio services into a single service. This offers no benefit to the users of this spectrum. With the current six radio services, block allocation of frequencies for each service, and separate frequency coordinators, the users of the public safety spectrum enjoy radio system performance closely related to their

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[7] The "not-in-my-backyard" syndrome

needs. There are significant differences between the criticality of messages, the duration of messages, the number of messages, and the radio discipline of the different user groups. There also are significant differences in the levels of radio coverage needed and the types of systems used by the different radio services. Systems in the Forestry-Conservation Radio Service, for instance, tend to be wide-area in nature with a low channel demand (usage) on a day-to-day basis. During a forest fire, however, the channel demand in the area around the fire expands dramatically. This requires a frequency utilization plan that allows for expansion of existing radio systems and, the addition of new radio systems within a fire area very quickly. Systems in the Police Radio Service, on the other hand, tend to be more localized in nature with a high channel demand on a day-to-day basis[8/]. The current block allocation of frequencies to separate radio services satisfies these divergent needs well. If there were to be a single public safety radio service, the State foresees conflicts between the user groups as to whose communications are more important. These conflicts may not be a factor in areas where there are more than enough frequencies to satisfy everyone's needs, but they will surely arise if there is a shortage of frequencies and some needs have to go unmet.

41. If, however, the Commission chooses to create a single public safety radio service, then the State believes it is critical that there be only one frequency coordinator. The proposal to allow the existing frequency coordinators to continue providing services to any and all comers is, as one coordinator described it, a "recipe for disaster". The services provided by the current frequency coordinators is an extension of the Commission's regulatory activities. Regulatory agencies must be fair to all in the procedures they adopt and consistent in the application of those procedures. Such would be nearly impossible to ensure if four separate coordination groups all have access to the same set of frequencies. Who would coordinate the coordinators

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[8] Public safety's need to respond to a disaster situation is not included in these examples. Disasters present a unique situation demanding increased communications capability in all services and at all levels of government.

and how would that coordination be accomplished? What would prevent a channel "reserved" by one coordinator for rapid expansion of services in an area for a forest fire from being assigned by another coordinator as the primary dispatch channel for a police agency in that same area? What happens if two coordinators, unbeknownst to each other, simultaneously assign the same channel to two different users in the same area and the Commission issues the licenses? This error might go undetected until the two parties build their radio systems and experience unacceptable interference. What then happens if the only way to resolve the conflict is for one of the users to move to a different frequency band? The cost of replacing otherwise "new" radio equipment, re-engineering the system, and re-installing the equipment could be devastating. Who pays for this "replacement"? Frequency assignments in the public safety radio services (all of the radio services for that matter) must be done in accordance with a well-thought-out plan that recognizes the differences in the types of communications being conducted and the need to accommodate surges in demand. The State is not ready to recommend any one of the current public safety coordination groups over any of the other groups. The Commission must base such a decision upon the capability of the group to handle all of the applicants in an equitable manner and procedures that would ensure the individual needs of the six current public safety radio services continue to be satisfied.

ITINERANT AND TEMPORARY OPERATIONS

42. The State is opposed to an increase in the number of itinerant frequencies beyond those currently available. The existing itinerant channels in the Business Radio Service, while they serve a useful purpose, are also the home of many unlicensed users. Radios on these channels are sold indiscriminately to any and all comers through a variety of outlets including stationery stores and mail-order catalogs. Oftentimes the buyer has no knowledge of how to use the radio properly or the requirement for any sort of licensing. The State is not immune to misuse of